Send to:

EPA- John Oslin
Region II NYC
290 Broadway
NY, NY 10007-1866

C-98-04-01

507690

# Madison industries inc.

APR 20 1998

April 3, 1998

Mr. Paul Harvey
Case Manager
New Jersey Department of Environmental Protection
Bureau of Federal Case Management
401 East State Street, 5th Floor, P.O. Box 028
Trenton, NJ 08625-0028

RE: **Shallow Groundwater Investigation and Proposal for the Installation of a Shallow Groundwater Recovery System (RS-2) Madison Industries, Inc.**

Dear Mr. Harvey:

This letter provides a summary of the results of the shallow groundwater investigation undertaken by Madison Industries, Inc. (Madison) along the southwest fence line in the vicinity of RW-4 and a proposal for the installation of a shallow groundwater recovery system (RS-2).

Background

The levels of zinc in monitoring well PA-B, located on the Perth Amboy Watershed and adjacent to the Madison site, have varied greatly during the past four years. Between the period of December 1993 (PMP No. 12) and December 1997 (PMP No. 28), concentrations of zinc in PA-B ranged from a low of 6.02 milligrams per liter (mg/l) to a high of 51.80 mg/l. Concurrently, concentrations of zinc on the Madison site have ranged from not detected (below the method detection limit [MDL]) to over 1,000 mg/l. Prior to the inception of shallow pumping near the Brass Loading Dock (RS-1), elevated levels of zinc were predominantly located in the area of RW-6.

RS-1, comprised of four recovery wells, has been removing elevated levels of zinc from the shallow portion of the aquifer since February 1997. With the approval of the New Jersey Department of Environmental Protection (the Department), recovery wells RW-4 and RW-6 had been removed from service in an effort to allow RS-1 to control and capture shallow groundwater with the highest concentrations of zinc. Madison continues to make significant progress toward the elimination of potential sources of elevated levels of zinc in groundwater. However, it is conceivable that groundwater containing elevated levels of zinc, previously beyond of the capture zone of RS-1 and not influenced by either RW-4 or RW-6, may be present at the southwest fence line, in the areas of RW-4 and PA-B.

Previous Investigations

In response to the Department's concern over the presence of zinc in PA-B, Madison independently initiated a shallow groundwater investigation along the southwest fence line in the vicinity of RW-4. This investigation was conducted during the week of September 29, 1997. The purpose of the investigation was to determine if concentrations of zinc in shallow groundwater were present in the study area and, if present, to develop a plan to install a shallow groundwater recovery system in this area.

As part of the investigation, Madison (through its contractor, Diamond Drilling Co.) drilled 15 borings to a depth of approximately 15 feet below ground surface at the locations shown on Figure 1. In general, the

borings were placed approximately 20 foot intervals, except in the area between borings B2 and B3 where an underground electrical line was present, and between borings B7 and B10. Additional borings were added at 10-foot intervals, in the area between borings B7 and B10, to better define the presence of zinc in groundwater in the vicinity of observation well X-4. The purpose of these borings was only to collect a "one-time" groundwater "screening" sample for determining the presence of zinc in shallow groundwater. No soil samples were collected for classification or element analysis.

Previous on-site investigations had proven that various methods such as Geoprobe and Hydropunch were unsuccessful in obtaining discrete groundwater samples from the soil/groundwater interface at a depth range of 10 to 15 feet below ground surface. Therefore, a screening method employed during previous investigations of this nature, approved by the Department, was utilized for this investigation. Specifically, a 10-foot section of 2-inch diameter PVC well screen (.010 slot) with a suitable length of PVC riser pipe was temporarily placed in the open boring as the drill stem was removed. The bottom depth of each well screen was placed at approximately 12 feet below ground surface. Each temporary casing was pumped with a gas-powered centrifugal pump for approximately 10 minutes, at a rate of approximately 10 gallons per minute (GPM), or until the discharge was relatively free of fines. All samples were collected directly from the pump and delivered to the Madison laboratory for rapid-turnaround analysis of zinc.

The results of the samples collected during this investigation indicated that zinc concentrations, greater than 10.0 mg/l, existed in an area along the southwest fence line in the vicinity of existing observation wells X-3 and X-5. The exact cause of elevated levels of zinc in groundwater in this area is unknown. Recent sampling results from RW-4 indicate concentrations of zinc not greater than 2.13 mg/l; however, zinc concentrations as high as 96.0 mg/l were observed in RW-4 during June 1995 (PMP No. 18) and December 1995 (PMP No. 20). As previously discussed, it is possible that groundwater, containing elevated levels of zinc, was present in this area and is beyond the current capture zone of RS-1 and too shallow for RW-4 to effectively remove. It is important to note that the difference in groundwater elevations, measured during PMP No. 28, between MI-9, located immediately down gradient of RS-1, and observation well X-4 was only 0.23 feet. These wells are approximately 400 feet apart, yielding a hydraulic gradient of only 0.00057 feet per foot. This very low gradient translates to minimal groundwater movement across the site toward the southwest fence line.

In an effort to determine whether localized pumping would decrease levels of zinc in this area, Madison, with the Department's approval, proposed a short-term, limited groundwater recovery effort utilizing an existing 2-inch diameter observation well. X-4 was selected for the recovery test because it was located at the approximate center of elevated levels of zinc in the study area. Pumping was accomplished using an electrical centrifugal pump at a rate of approximately 6 GPM. The discharge from X-4 was pumped to the surface water collection basin to the west of the Maintenance Building where it was further transferred to the Madison water treatment facility. This water was treated and discharged to the OBMUA sewer system. When feasible, Madison monitored the discharge from X-4 on a daily basis from November 21, 1997 through March 16, 1998; Table 1 provides a summary of zinc concentrations for observation well X-4 for this time period. Additionally, Madison collected periodic samples from observation wells X-3 and X-5 to determine if pumping at X-3 would affect zinc concentrations in these wells; these values are also provided in Table 1.

As indicated on Table 1, zinc concentrations in X-4 averaged 51.2 mg/l and ranged from 35.3 mg/l to 82.0 mg/l. Figure 2 provides a graphical representation of zinc concentrations for observation wells X-3, X-4, and X-5. As indicated on Figure 2, on an average, concentrations of zinc in the three observation wells declined at a relatively slow rate; however, it is expected that concentration values would decrease in proportion to the rate of pumping. This condition was evident with commencement of pumping at RS-1 when average zinc concentrations went from 1,095 mg/l on February 21, 1997 to 358 mg/l on March 17, 1998. The combined pumping rate of all wells in RS-1 was approximately 60 GPM during that time.

Proposed Scope of Work

It is apparent that pumping X-4, even at a rate of 6 GPM, has had a slight, but positive result on the reduction of zinc in the vicinity of that well and the wells immediately adjacent to it. Despite the fact that the moderate levels of zinc present in shallow groundwater in the area of X-4 are not unlike those found elsewhere on the site, Madison will continue to respond proactively and address areas of concern on the site. In this regard, Madison is proposing to install a shallow groundwater recovery system (RS-2) along the southwest fence line as indicated on Figure 3. The exact well locations will be determined in the field. RS-2 is expected to exhibit a horizontal, side gradient influence of approximately 150 feet, which will be adequate to capture and control shallow groundwater containing elevated levels of zinc in this area. RS-2 is not expected to negatively impact the operation of RS-1, but instead will serve to enhance the removal of zinc and provide secondary hydraulic control on the site.

RS-2 will consist of three 4-inch diameter shallow wells, installed to a maximum depth of 20 feet below ground surface. The proposed depth and screen interval will be sufficient to provide adequate groundwater recovery in times of high and low groundwater level conditions and will intercept groundwater containing elevated levels of zinc. The wells will be installed in a manner consistent with the installation of RS-1 by a New Jersey licensed well driller. Submersible pumps, capable of pumping a maximum capacity of 15 GPM, will be installed in each well. The discharge from these wells will be treated on site and will be used either on site or discharged to the Old Bridge Municipal Utilities Authority sewer system.

Madison proposes to utilize existing monitoring wells WCC-11S and PA-B, located down gradient of RS-2, to monitor the effects of the new system. It should be noted that no historical analytical data is available for WCC-11S. Madison anticipates collecting samples from these wells on a monthly basis for three months and once every quarter thereafter, consistent with the ongoing PMP sampling events. As with RS-1, Madison will collect groundwater samples from the RS-2 wells on a daily basis and collect groundwater samples from the existing observation wells, X-3, X-4, and X-5 twice weekly. Water levels will also be obtained to monitor the draw down effects of RS-2 on a regular basis.

Schedule for Implementation

Madison proposes to begin installation of the shallow groundwater recovery system as soon as possible. The actual timeframe for mobilization and installation will be contingent upon the Department's approval of this action, contractor availability, and site conditions and preparation.

If you have any questions or comments regarding this matter, please contact Frank Holloway or me.

Very truly yours,

MADISON INDUSTRIES, INC.

Barry J. Vroeginday, CPG
Director, Site Remediation

Enclosures

**TABLE 1**
**SUMMARY OF ZINC CONCENTRATIONS**
**OBERSERVATION WELLS X-3, X-4, X-5 AND PA-B**
**MADISON INDUSTRIES, INC.**

| DATE SAMPLED | ZINC CONCENTRATION (MG/L) | | | |
|---|---|---|---|---|
| | X-3 | X-4 | X-5 | PA-B |
| 11/21/97 | 90.0 | 53.0 | 99.0 | |
| 11/24/97 | 90.0 | 49.3 | 100.0 | |
| 11/25/97 | | 55.0 | | |
| 11/26/97 | | 78.0 | | |
| 12/5/97 | 79.0 | * | 92.0 | |
| 12/8/97 | | 51.7 | | |
| 12/9/97 | | 50.9 | | |
| 12/10/97 | | 49.6 | | 17.3 |
| 12/11/97 | | * | | |
| 12/12/97 | 57.0 | * | 90.3 | |
| 12/16/97 | 58.0 | * | 110.0 | |
| 12/19/97 | 59.0 | * | 107.0 | |
| 12/23/97 | 67.0 | * | 105.0 | |
| 1/6/98 | 72.0 | 46.0 * | 98.0 | |
| 1/9/98 | 33.6 | 56.0 * | 21.8 | |
| 1/10/98 | 51.9 | 43.7 * | 84.0 | |
| 1/13/98 | 60.0 | 65.0 | 69.0 | |
| 1/14/98 | | 55.0 | | |
| 1/15/98 | | 41.3 | | |
| 1/16/98 | 71.0 | 44.9 | 103.0 | |
| 1/19/98 | | 49.6 | | |
| 1/20/98 | 19.2 | 51.0 | 21.4 | |
| 1/21/98 | | 53.0 | | |
| 1/22/98 | | 55.0 | | |
| 1/23/98 | 58.0 | 53.0 | 86.0 | |
| 1/26/98 | | 82.0 | | |
| 1/27/98 | 51.0 | 49.6 | 29.6 | |
| 1/28/98 | | 61.0 | | |
| 1/29/98 | | 82.0 | | |
| 1/30/98 | 52.1 | 49.6 | 80.0 | |
| 2/2/98 | | 47.0 | | |
| 2/3/98 | | 70.0 | | |
| 2/4/98 | | 63.0 | | |
| 2/5/98 | | 47.5 | | |
| 2/6/98 | 41.7 | 50.0 | 79.0 | |
| 2/9/98 | | 49.8 | | |
| 2/10/98 | | 43.7 | | |
| 2/11/98 | | 46.8 | | |
| 2/12/98 | | 59.0 | | |
| 2/13/98 | 55.0 | 50.0 | 72.0 | |
| 2/16/98 | | 41.7 | | |
| 2/17/98 | 60.0 | 52.0 | 101.0 | |
| 2/18/98 | | 45.3 | | |
| 2/19/98 | | 51.0 | | |
| 2/20/98 | | 63.0 | | |
| 2/23/98 | | 42.0 | | |

**TABLE 1**
**SUMMARY OF ZINC CONCENTRATIONS**
**OBERSERVATION WELLS X-3, X-4, X-5 AND PA-B**
**MADISON INDUSTRIES, INC.**

| DATE SAMPLED | ZINC CONCENTRATION (MG/L) | | | |
|---|---|---|---|---|
| | X-3 | X-4 | X-5 | PA-B |
| 2/24/98 | | 35.3 | | |
| 2/25/98 | | 45.1 | | |
| 2/26/98 | | 46.3 | | |
| 2/27/98 | 75.0 | 48.2 | 61.0 | |
| 3/2/98 | | 42.5 | | |
| 3/3/98 | 43.7 | 40.8 | 102.0 | |
| 3/6/98 | 42.2 | 40.7 | 111.0 | |
| 3/9/98 | | 71.0 | | |
| 3/10/98 | | 39.8 | | |
| 3/11/98 | | 38.1 | | 16.5 |
| 3/12/98 | | 39.6 | | |
| 3/13/98 | 44.1 | 39.3 | 98.0 | |
| 3/16/98 | | 41.4 | | |
| AVERAGE | 57.8 | 51.2 | 83.5 | 16.9 |
| MINIMUM | 19.2 | 35.3 | 21.4 | 16.5 |
| MAXIMUM | 90.0 | 82.0 | 111.0 | 17.3 |

**NOTES:**

* - Pump not operational; sample collected with bailer if applicable

Blank - Sample not collected

All samples analyzed by Madison Industries, Inc. laboratory

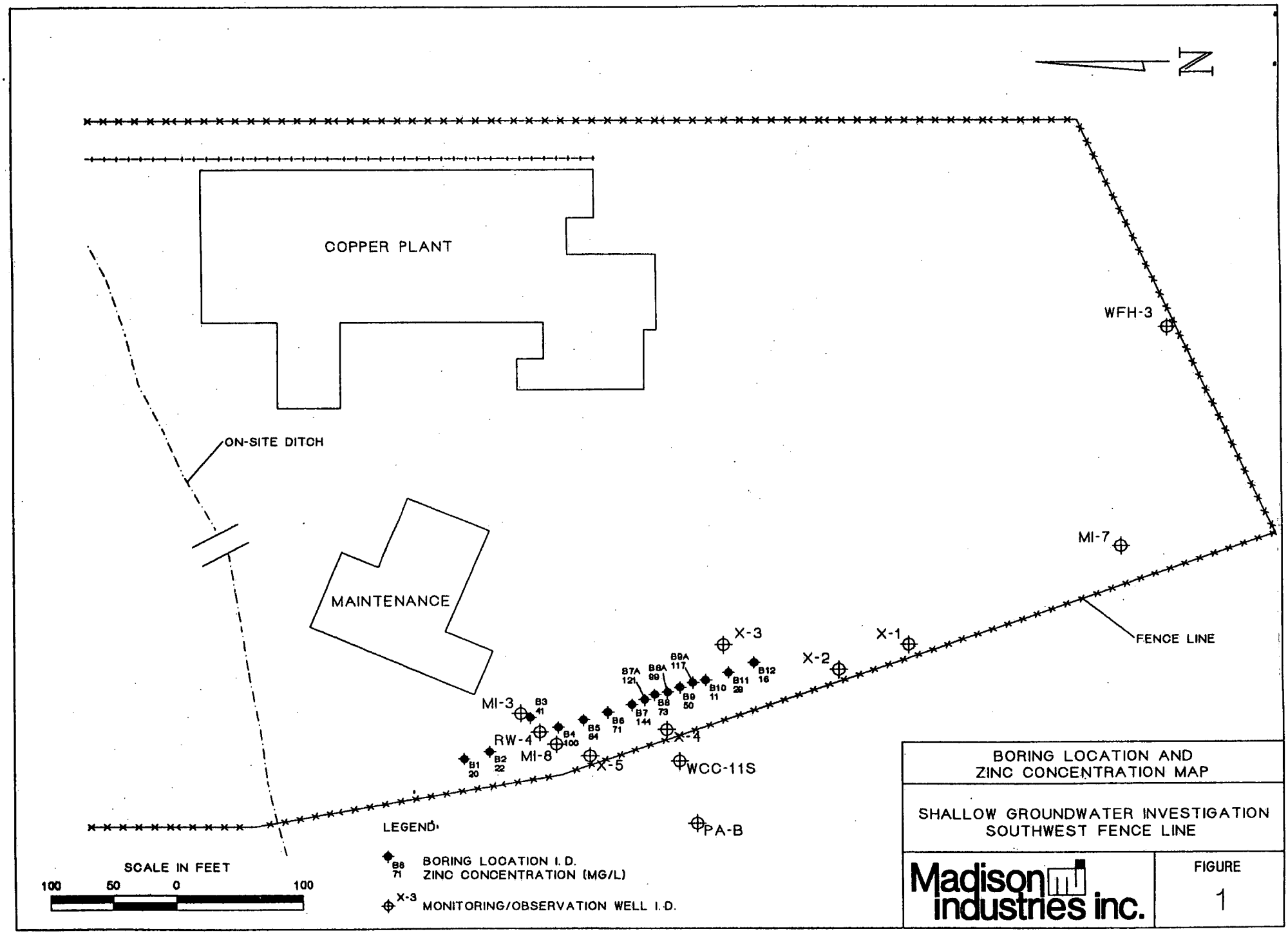
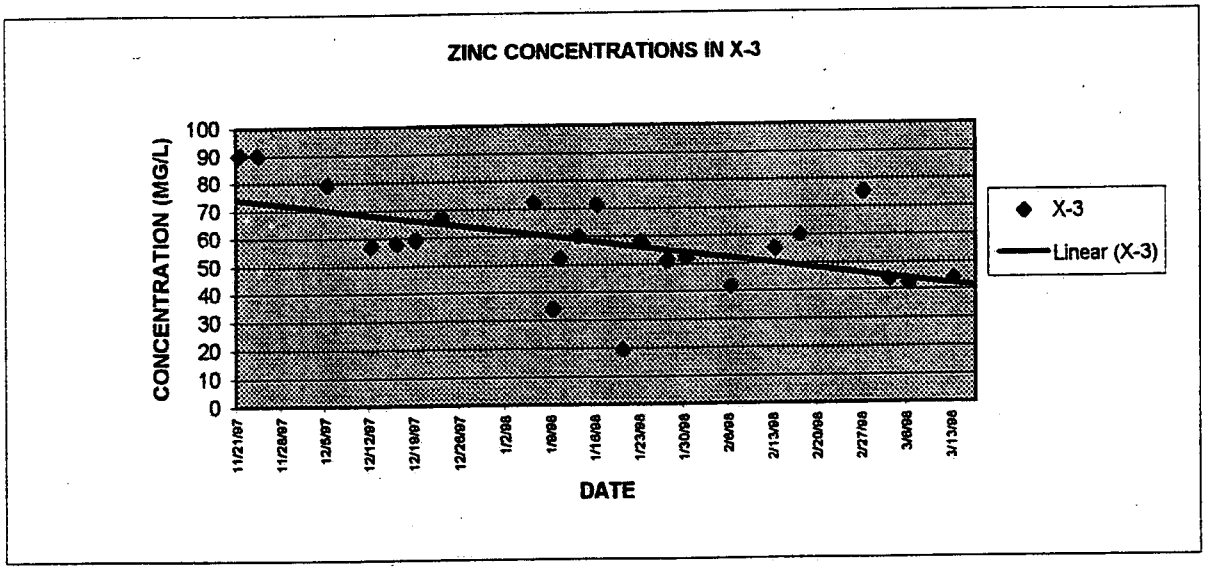
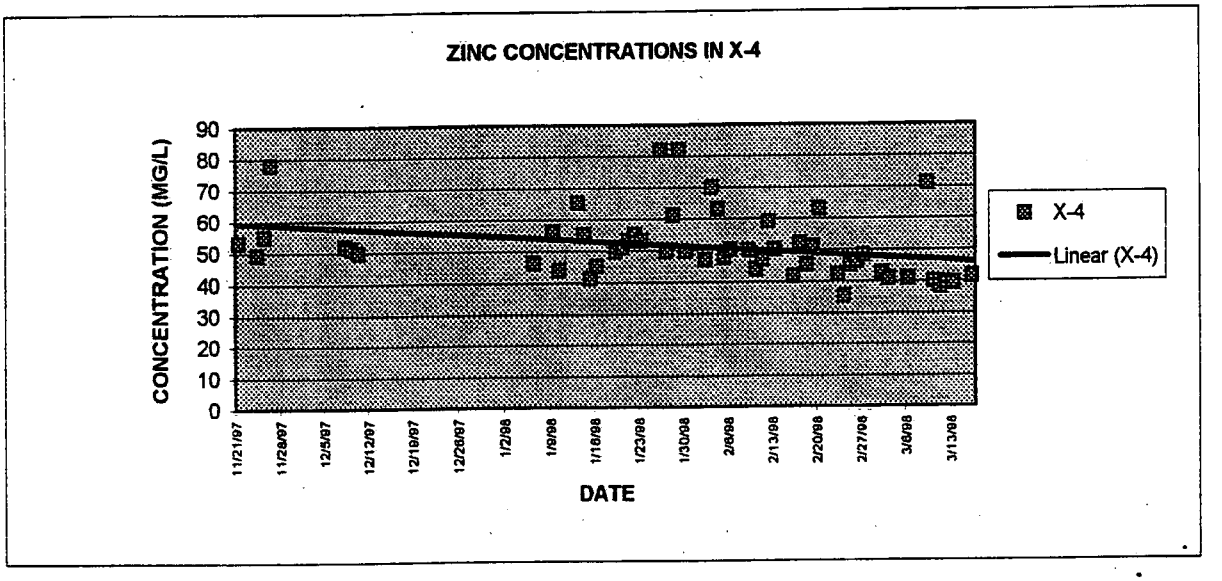
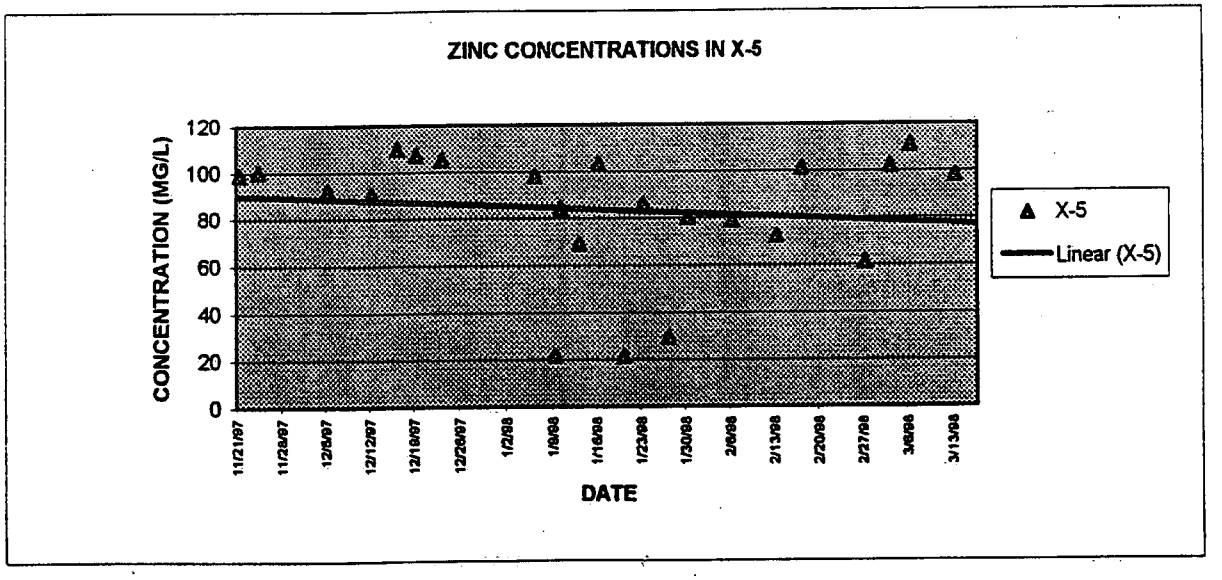
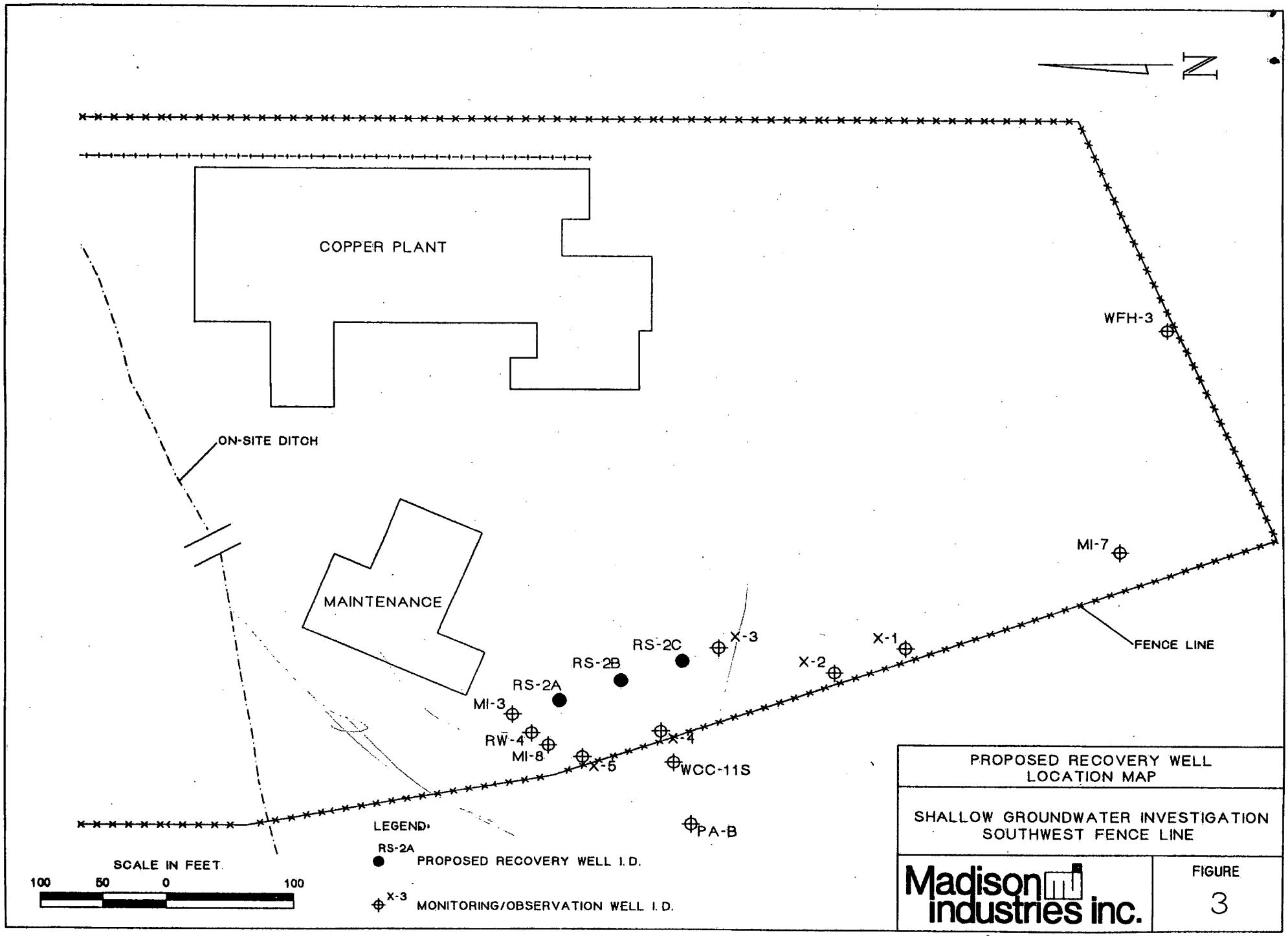

N
COPPER PLANT
WFH-3
ON-SITE DITCH
MAINTENANCE
MI-7
FENCE LINE
X-3
X-1
X-2
MI-3
B3 41
B7A 121
B8A 99
B9A 117
B12 16
B11 29
B10 11
B9 50
B8 73
B7 144
B6 71
B5 84
B4 100
RW-4
MI-8
X-4
X-5
WCC-11S
B1 20
B2 22
PA-B
LEGEND
B8 71 BORING LOCATION I.D. ZINC CONCENTRATION (MG/L)
X-3 MONITORING/OBSERVATION WELL I.D.
SCALE IN FEET
100 50 0 100
BORING LOCATION AND ZINC CONCENTRATION MAP
SHALLOW GROUNDWATER INVESTIGATION SOUTHWEST FENCE LINE
Madison industries inc.
FIGURE 1

**FIGURE 2**
**GRAPHICAL REPRESENTATION OF ZINC CONCENTRATIONS IN OBSERVATION WELLS X-3, X-4 AND X-5**
**MADISON INDUSTRIES, INC.**




N
COPPER PLANT
ON-SITE DITCH
MAINTENANCE
WFH-3
MI-7
FENCE LINE
RS-2C
X-3
X-1
RS-2B
X-2
RS-2A
MI-3
RW-4
MI-8
X-4
X-5
WCC-11S
PA-B
LEGEND:
RS-2A
PROPOSED RECOVERY WELL I.D.
X-3
MONITORING/OBSERVATION WELL I.D.
SCALE IN FEET
100 50 0 100
PROPOSED RECOVERY WELL LOCATION MAP
SHALLOW GROUNDWATER INVESTIGATION
SOUTHWEST FENCE LINE
Madison industries inc.
FIGURE
3